



DEPARTMENT OF MEDICINE, SOLNA

K2F6098, Basic Bioinformatics, 3 credits (hec)

Grundläggande bioinformatik, 3 högskolepoäng

Third-cycle level / Forskarnivå

Approval

This syllabus was approved by The Committee for Doctoral Education on 2025-09-18, and is valid from spring semester 2026.

Responsible department

Department of Medicine, Solna, Faculty of Medicine

Contributing department/s

Department of Medicine, Solna

Prerequisite courses, or equivalent

Basic knowledge in molecular biology from undergraduate level.

Purpose & Intended learning outcomes

Purpose

This course aims to give the students who work mainly in wet lab, an opportunity to obtain a foundation in the principles of bioinformatics, so they can start to develop skills in bioinformatics. This is done by equipping and familiarizing the students with several bioinformatic tools commonly used in molecular biology.

Intended learning outcomes

By the end of the course the participants should be able to:

- Use the command line interface (a text-based means of interacting with a computer),
- Apply principles of python (a programming language) and be able to manage data sets and create graphs,
- Apply the basic principles for analysing high-throughput sequencing data,
- Critically assess the main steps of the taught data analysis techniques.

Course content

1. Bash command-line interface: Learn essential terminal commands, shell scripting, and workflow automation.
2. Genome Browsers: Interactively explore and visualize genomic data.
3. Python programming: Develop Python skills focused on data analysis and creating visualizations.
4. RNA-seq data analysis: Gain hands-on experience with processing and analyzing high-throughput RNA-seq datasets, including both bulk and single-cell sequencing.

Forms of teaching and learning

The course begins with program installations and introductory asynchronous online exercises. Each student is expected to complete these exercises before the start of the on-site and synchronous sessions. Information and instructions for this part of the course will be sent out via email and Canvas at least three weeks prior to the course start date.

The on-site and synchronous portion of the course spans seven days, each beginning with an interactive introductory lecture. This is followed by hands-on computer exercises. The majority of the course consists of practical, group-based work, where students collaborate in small groups of 2–3 and engage actively with teachers and moderators.

Language of instruction

The course is given in English

Grading scale

Pass (G) /Fail (U)

Compulsory components & forms of assessment

Compulsory components

Both the introductory lectures and the practical sessions are compulsory, unless stated they are not. This is because the course is designed to gradually increase in complexity. Absence has to be compensated for in agreement with the course organizers. The examination is compulsory.

Forms of assessment

The examination aligns with the intended learning outcomes and consists of practical exercises based on the content covered in each session. These exercises are completed on the final day of the course.

Students may discuss the examination tasks and their approaches in small groups (2–3 participants) and with the teachers. However, each student must submit their own individual answers.

Course literature

Students should bring their own computer with the programs required for the course installed. We offer an online session before the face-to-face part to troubleshoot any installation issues that may arise.

The admitted students will be contacted in advance by the course organisers with instructions for the installation process. Recommended literature and resources for each topic will be distributed during the course.

Other information

Replacing K2F5235 and H5F5235 (2,5 HEC).